

FIG. 1

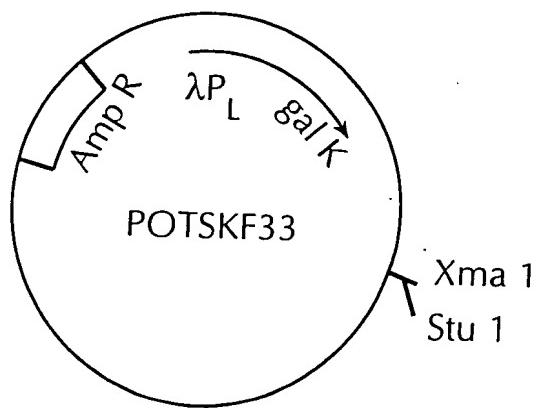


FIG. 2

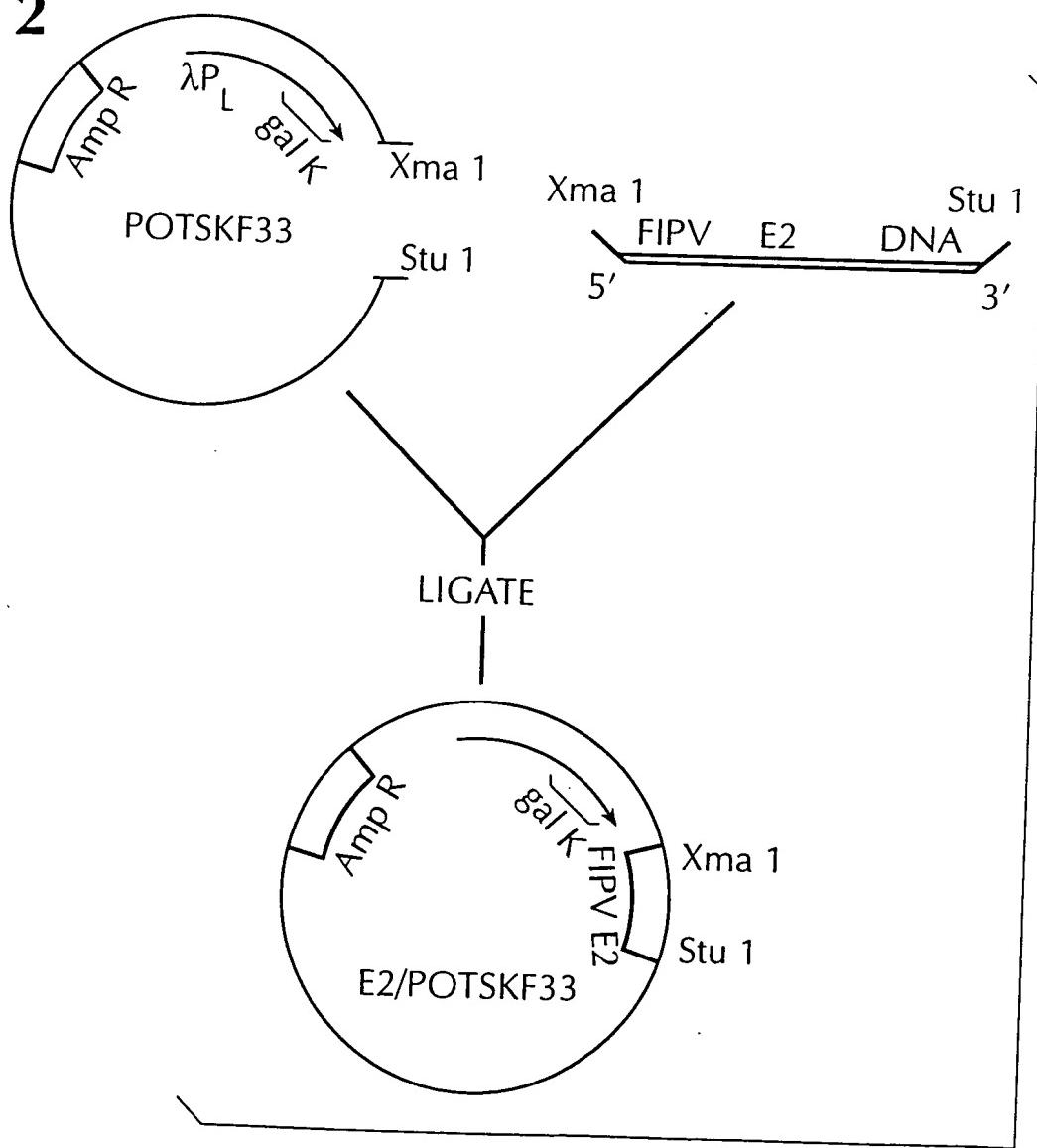


FIG. 3A

AR58-3 PCR expression clone
SEQ ID NO: 19- nucleotide sequence
SEQ ID NO: 20- amino acid sequence

ATG	GAT	CCC	GAA	TTC	CAA	GAA	AAA	ACA	CAC	TCT	CTG	TTT	39	
Met	Asp	Pro	Glu	Phe	Gln	Glu	Lys	Thr	Gln	Ser	Leu	Phe		
1					5				10					
GCC	AAC	GCA	TTC	GGC	TAC	CCT	GCC	ACT	CAC	ACC	ATT	CAG	78	
Ala	Asn	Ala	Phe	Gly	Tyr	Pro	Ala	Thr	His	Thr	Ile	Gln		
15					20								25	
GGC	CCT	GGC	CGC	GTG	AAT	TTG	ATT	GGT	GAA	CAC	ACC	GAC	117	
Ala	Pro	Gly	Arg	Val	Asn	Leu	Ile	Gly	Glu	His	Thr	Asp		
									35					
TAC	AAC	GAC	GGT	TTC	GTT	CTG	CCC	TGC	GCG	ATT	GAT	TAT	156	
Tyr	Asn	Asp	Gly	Phe	Val	Leu	Pro	Cys	Ala	Ile	Asp	Tyr		
40					45				50					
CAA	ACC	GTG	ATC	CCT	AAT	ACC	Xma	CGG	GGC	ACT	GCT	AAT	GCA	195
Gln	Thr	Val	Ile	Pro	Asn	Thr		Arg	Gly	Thr	Gly	Asn	Ala	
					55			60					65	
CGT	GGT	AAA	CCA	TTA	TTA	TTT	CAT	GTG	CAT	GGT	GAG	CCT	234	
Arg	Gly	Lys	Pro	Leu	Leu	Phe	His	Val	His	Gly	Glu	Pro		
					70			75						
GTT	AGT	GTT	ATT	ATA	TAT	ATA	TCC	GCT	TAT	AGG	GAT	GAT	273	
Val	Ser	Val	Ile	Ile	Tyr	Ile	Ser	Ala	Tyr	Arg	Asp	Asp		
					80			85					90	

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FIG. 3B

FIG. 4A

DF2 FIPV, nucleotides 1- 4365 [SEQ ID NO:21]
DF2 FIPV, amino acid 1- 1454 [SEQ ID NO:22]

**DF2-HP, nucleotides* 1- 2246 [SEQ ID NO:23]
DF2-HP, amino acids* 1- 748 [SEQ ID NO:24]**

ATG	ATT	GTG	CTC	GTA	ACT	TGC	CTC	TTG	TTA	TGT	TCA	TAC	CAC	ACA
Met	Ile	Val	Leu	Val	Thr	Cys	Leu	Leu	Leu	Cys	Ser	Tyr	His	Thr
1					5				10		15			

GTT	TTG	AGT	ACA	AAT	AAT	GAA	TGC	ATA	CAA	GTT	AAC	GTA	CAA	
Val	Leu	Ser	Thr	Thr	Asn	Asn	Glu	Cys	Ile	Gln	Val	Asn	Val	
								25			30			

TTG	GCT	GGC	AAT	GAA	AAC	CTT	ATC	AGA	GAT	TTT	CTG	TTT	AGT	AAC
Leu	Ala	Gly	Asn	Glu	Asn	Leu	Ile	Arg	Asp	Phe	Leu	Phe	Ser	Asn
								40			45			

AAA	GAA	GGA	AGT	GTA	GTT	GTT	GGT	TAT	TAC	CCT	ACA	GAG	GTG	192
Lys	Glu	Glu	Gly	Ser	Val	Val	Gly	Gly	Tyr	Tyr	Pro	Thr	Glu	Val
								55			60			

T* G*

TGG	TAC	AAC	TGC	TCT	AGA	ACA	GCA	CAA	ACT	ACT	GCC	TTT	CAG	TAT	TTT
Trp	Tyr	Asn	Cys	Ser	Arg	Thr	Ala	Gln	Thr	Ala	Phe	Gln	Tyr	Phe	
65					70					Arg*	75		80		

AAT	AAT	ATA	CAT	GCC	TTT	TAT	TTT	GTT	ATG	GAA	GCC	ATG	GAA	AAT	AGC
Asn	Asn	Ile	His	Ala	Phe	Tyr	Phe	Val	Met	Glu	Ala	Met	Glu	Asn	Ser
								85			90			95	

FIG. 4B

FIG. 4C

AAC	AAT	GTC	ACA	CTT	TTG	TAT	TCA	CGC	TCA	AGC	ACT	GCT	ACC	TGG	GAA	672
Asn	Asn	Val	Thr	Leu	Tyr	Ser	Arg	Ser	Ser	Ser	Thr	Ala	Thr	Trp	Gl	
210												220				
TAC	AGT	GCT	GCA	TAT	GCT	TAC	CAA	GGT	TCT	AAC	TTC	ACT	TAT	TAC	720	
Tyr	Ser	Ala	Ala	Tyr	Ala	Tyr	Gln	Gly	Val	Ser	Asn	Phe	Thr	Tyr	Tyr	
225										235						240
AAG	TTA	AAT	AAC	ACC	AAT	GGT	CTA	AAA	ACC	TAT	GAA	TTA	TGT	GAA	GAT	768
Lys	Leu	Asn	Asn	Thr	Asn	Gly	Leu	Lys	Thr	Tyr	Glu	Leu	Cys	Glu	Asp	
									250							255
TAT	GAA	CAT	TGC	ACT	GGC	TAT	GCT	ACC	AAT	GTA	TTT	GCT	CCG	ACA	TCA	816
Tyr	Glu	His	Cys	Thr	Gly	Tyr	Ala	Thr	Asn	Val	Phe	Ala	Pro	Thr	Ser	
									265							270
T*																
GGT	GGT	TAC	ATA	CCT	GAT	GGA	TTT	AGT	TTT	AAC	AAT	TGG	TTC	TTG	CTT	864
Gly	Gly	Tyr	Ile	Pro	Asp	Gly	Phe	Ser	Phe	Asn	Asn	Trp	Phe	Leu	Leu	
									280							285
ACA	AAT	AGT	TCC	ACT	TTT	GTT	AGT	GGC	AGG	TTT	GTA	ACA	AAT	CAA	CCA	912
Thr	Asn	Ser	Ser	Thr	Phe	Val	Ser	Gly	Arg	Phe	Val	Thr	Asn	Gln	Pro	
									295			300				
TTA	TTG	ATT	AAT	TGC	TTG	TGG	CCA	GTC	CCC	AGT	TTT	GGT	GTA	GCA	GCA	960
Leu	Leu	Ile	Asn	Cys	Leu	Trp	Pro	Val	Pro	Ser	Phe	Gly	Val	Ala	Ala	
										310		315				320
CAA	GAA	TTT	TGT	TTT	GAA	GGT	GCA	CAG	TTT	AGC	CAA	TGT	AAT	GGT	GTG	1008
Gln	Glu	Phe	Cys	Phe	Glu	Gly	Ala	Gln	Phe	Ser	Gln	Cys	Asn	Gly	Val	
										325		330				335

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FIG. 4D

TCT	TTA	AAT	AAC	ACA	GAT	GTT	ATT	AGA	TTC	AAC	CTT	AAT	TTC	ACT	1056	
Ser	Leu	Asn	Asn	Thr	Val	Asp	Val	Ile	Arg	Phe	Asn	Leu	Asn	Phe	Thr	
340								345							350	
GCA	GAT	GTA	CAA	TCT	GGT	ATG	GGT	GCT	ACA	GTA	TTT	TCA	CTG	AAT	ACA	1104
Ala	Asp	Val	Gln	Ser	Gly	Met	Gly	Ala	Thr	Val	Phe	Ser	Leu	Asn	Thr	
355							360						365			
ACA	GGT	GGT	GTC	ATT	CTT	GAA	ATT	TCA	TGT	TAT	AGT	GAC	ACA	GTG	AGT	1152
Thr	Gly	Gly	Val	Ile	Leu	Glu	Ile	Ser	Cys	Tyr	Ser	Asp	Thr	Val	Ser	
370						375						380				
GAG	TCT	AGT	TCT	TAC	AGT	TAT	GGT	GAA	ATC	CCG	TTC	GGC	ATA	ACT	GAC	1200
Glu	Ser	Ser	Ser	Tyr	Ser	Tyr	Gly	Glu	Ile	Pro	Phe	Gly	Ile	Thr	Asp	
385						390				395						400
GGA	CCA	CGA	TAC	TGT	TAT	GTA	CTT	TAC	AAT	GGC	ACA	GCT	CTT	AAA	TAT	1248
Gly	Pro	Arg	Tyr	Cys	Tyr	Val	Leu	Tyr	Asn	Gly	Thr	Ala	Leu	Lys	Tyr	
						405				410						415
TTA	GGA	ACA	TTA	CCA	CCC	AGT	GTA	AAG	GAA	ATT	GCT	ATT	AGT	AAG	TGG	1296
Leu	Gly	Thr	Leu	Pro	Pro	Ser	Val	Lys	Glu	Ile	Ala	Ile	Ser	Lys	Trp	
420								425								

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FIG. 4E

GGC	CAT	TTC	TAT	AAT	GGT	TAC	AAT	TTC	TTT	AGC	ACA	TTT	CCT	ATT	1344	
Gly	His	Phe	Tyr	Ile	Asn	Gly	Tyr	Asn	Phe	Phe	Ser	Thr	Phe	Pro	Ile	
435															445	
GGT	TGT	ATA	TCT	TTT	AAT	TTA	ACC	ACT	GGT	GCT	AGT	GGA	GCT	TTT	TGG	1392
Gly	Cys	Ile	Ser	Phe	Asn	Leu	Thr	Thr	Gly	Ala	Ser	Gly	Ala	Phe	Trp	
450															Val*	460
ACA	ATT	GCT	TAC	ACA	TCG	TAT	ACT	GAA	GCA	TTA	GTA	CAA	GTT	GAA	AAC	1440
Thr	Ile	Ala	Tyr	Thr	Ser	Tyr	Thr	Glu	Ala	Leu	Val	Gln	Val	Glu	Asn	
465																480
ACA	GCT	ATT	AAA	AAT	GTG	ACG	TAT	TGT	AAC	AGT	CAC	ATT	AAT	AAC	ATT	1488
Thr	Ala	Ile	Lys	Asn	Val	Thr	Tyr	Cys	Asn	Ser	His	Leu	Asn	Ile	Asn	
																495
AAA	TGT	TCT	CAA	CTT	ACT	GCT	AAT	TTG	ATT	AAT	GGA	TTT	TAT	CCT	GTT	1536
Lys	Cys	Ser	Gln	Leu	Thr	Ala	Asn	Leu	Asn	Asn	Gly	Phe	Tyr	Pro	Val	
																510
GCT	TCA	AGT	GAA	GTA	GGT	TTC	GTT	AAT	AAG	AGT	GTT	GTC	TTA	TTA	CCT	1584
Ala	Ser	Ser	Gl	u	val	Gly	Phe	Val	Asn	Lys	Ser	Val	Val	Leu	Leu	
515																525
AGC	TTT	TRC	ACA	CAC	ACC	GTC	AAT	ATA	ACC	ATT	GAT	CTR	GGT	ATG	1632	
Ser	Phe	Phe	Thr	His	Thr	Ala	Val	Asn	Ile	Thr	Ile	Asp	Leu	Gly	Met	
530																540
T*																
Tyr*																
535																

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FIG. 4F

AAG	CRT	AGT	GGT	TAT	GGT	CAA	CCC	ATA	GCC	TCG	ACA	CTA	AGT	AAC	ATC	1680
Lys	Leu	Ser	Gly	Tyr	Gly	Gln	Gln	Pro	Ile	Ala	Ser	Thr	Leu	Ser	Asn	Ile
545					550					555						560
ACA	CTA	CCA	ATG	CAG	GAT	AAC	AAT	ACT	GAT	GTG	TAC	TGT	ATT	CGT	TCT	1728
Thr	Leu	Pro	Met	Gln	Asp	Asn	Asn	Thr	Asp	Val	Tyr	Cys	Ile	Arg	Ser	
					565				570						575	
AAC	CAA	TTC	TCA	GTT	TAT	GTT	CCT	ACT	TGC	AAA	AGT	TCT	TTA	TGG	1776	
Asn	Gln	Phe	Ser	Val	Tyr	Val	Pro	Ser	Thr	Cys	Lys	Ser	Ser	Leu	Trp	
									His	585					590	
GAC	AAT	ATT	TTT	AAT	CAA	GAC	TGC	ACG	GAT	GTT	TTA	GAG	GCT	ACA	GCT	1824
Asp	Asn	Ile	Phe	Asn	Gln	Asp	Cys	Thr	Asp	Val	Leu	Glu	Ala	Thr	Ala	
									600						605	
GTT	ATA	AAA	ACT	GGT	ACT	TGT	CCT	TCA	TTT	GAT	AAA	TTG	AAC	AAT	1872	
Val	Ile	Lys	Thr	Gly	Thr	Cys	Pro	Phe	Ser	Phe	Asp	Lys	Leu	Asn	Asn	
									615						620	
TAC	TTG	ACT	TTT	AAC	AAG	TTC	TGT	TGT	TCG	TG	AGT	CCT	GTT	GGT	GCT	1920
Tyr	Leu	Thr	Phe	Asn	Lys	Phe	Cys	Leu	Ser	Leu	Ser	Pro	Val	Gly	Ala	
									625						635	
AAT	TGC	AAG	TTT	GAT	GTT	GCT	GCA	CGT	ACA	AGA	ACC	AAT	GAG	CAG	GTT	1968
Asn	Cys	Lys	Phe	Asp	Val	Ala	Ala	Arg	Thr	Arg	Thr	Asn	Glu	Gln	Val	
									645						650	
GTT	AGA	AGT	CTA	TAT	GTA	ATA	TAT	GAA	GAA	GGA	GAC	AAC	ATA	GRG	GGT	2016
Val	Arg	Ser	Leu	Tyr	Val	Ile	Tyr	Glu	Glu	Gly	Asp	Asn	Ile	Val	Gly	
									660						665	

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FIG. 4G

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FIG. 4H

GTT	GAT	TGT	GAA	CCT	GTC	ATA	ACC	TAT	TCT	AAT	ATA	GGT	GTT	TGT	AAA	2448
Val	Asp	Cys	Glu	Pro	Val	Ile	Thr	Tyr	Ser	Asn	Ile	Gly	Val	Cys	Lys	
																815
805									810							
AAT	GGT	GCT	TTG	GTT	TTT	ATT	AAC	GTC	ACA	CAT	TCT	GAC	GGA	GAC	GTG	2496
Asn	Gly	Ala	Leu	Val	Phe	Ile	Asn	Val	Thr	His	Ser	Asp	Gly	Asp	Vai	
																830
820								825								
CAA	CCA	ATT	AGC	ACT	GGT	AAT	GTC	ACG	ATA	CCT	ACA	AAT	TTT	ACC	ATA	2544
Gln	Pro	Ile	Ser	Thr	Gly	Asn	Val	Thr	Ile	Pro	Thr	Asn	Phe	Thr	Ile	
																845
835							840									
TCT	GTG	CAA	GTT	GAA	TAC	ATG	CAG	GTT	TAC	ACT	ACA	CCA	GTA	TCA	ATA	2592
Ser	Val	Gln	Val	Glu	Tyr	Met	Gln	Val	Tyr	Thr	Thr	Pro	Val	Ser	Ile	
																850
855																
GAT	TGT	GCA	AGA	TAC	GTT	TGT	AAT	GGT	AAC	CCT	AGA	TGT	AAC	AAA	TTG	2640
Asp	Cys	Ala	Arg	Tyr	Val	Cys	Asn	Gly	Asn	Pro	Arg	Cys	Asn	Lys	Leu	
																865
865						870				875						
TTA	ACA	CAA	TAT	GTG	TCT	GCA	TGT	CAA	ACT	ATT	GAA	CAA	GCA	CTT	GCA	2688
Leu	Thr	Gln	Tyr	Val	Ser	Ala	Cys	Gln	Thr	Ile	Glu	Gln	Ala	Leu	Ala	
																880
885																
ATG	GGT	GCC	AGA	CTT	GAA	AAC	ATG	GAG	GTT	TCC	ATG	TTG	TTT	GTC	2736	
Met	Gly	Ala	Arg	Leu	Glu	Asn	Met	Glu	Val	Asp	Ser	Met	Leu	Phe	Vai	
																900
900									905							

FIG. 4I

TCG	GAA	AAT	GCC	CTT	AAA	TTG	GCA	TCT	GTT	GAG	GCG	TTC	AAT	AGT	ACA	2784
Ser	Glu	Asn	Ala	Leu	Lys	Leu	Ala	Ser	Val	Glu	Ala	Phe	Asn	Ser	Thr	
915																925
GAA	AAT	TTA	GAT	CCT	ATT	TAC	AAA	GAA	TGG	CCT	AGC	ATA	GGT	GGT	TCT	2832
Glu	Asn	Leu	Asp	Pro	Ile	Tyr	Lys	Glu	Trp	Pro	Ser	Ile	Gly	Gly	Ser	
930																940
TGG	CTA	GGA	GGT	CTA	AAA	GAT	ATA	CTA	CCG	TCC	CAT	AAT	AGC	AAA	CGT	2880
Trp	Leu	Gly	Gly	Leu	Lys	Asp	Ile	Leu	Pro	Ser	His	Asn	Ser	Lys	Arg	
945																955
AAG	TAT	GGT	TCT	GCT	ATA	GAA	GAT	TTG	CTT	GAT	AAA	GTT	GTA	ACA	2928	
Lys	Tyr	Gly	Ser	Ala	Ile	Glu	Asp	Leu	Leu	Phe	Asp	Lys	Val	Val	Thr	
																970
TCT	GGT	TTA	GGT	ACA	GTT	GAT	GAA	GAT	TAT	AAA	CGT	TGT	ACT	GGT	GGT	2976
Ser	Gly	Leu	Gly	Thr	Val	Asp	Glu	Asp	Tyr	Lys	Arg	Cys	Thr	Gly	Gly	
																980
TAC	GAC	ATA	GCA	GAC	TTG	TGT	GCT	CAA	TAT	TAC	AAT	GGC	ATC	ATG	3024	
Tyr	Asp	Ile	Ala	Asp	Leu	Val	Cys	Ala	Gln	Tyr	Tyr	Asn	Gly	Ile	Met	
																995
GTT	CTA	CCA	GGT	GTA	GCT	AAT	GCT	GAC	AAG	ATG	ACT	ATG	TAC	ACA	GCA	3072
Val	Leu	Pro	Gly	Val	Ala	Asn	Ala	Asp	Lys	Met	Thr	Met	Tyr	Thr	Ala	
																1010
																1015
TCA	CTT	GCA	GGT	GGT	ATA	ACA	TTA	GGT	GCA	CTT	GGT	GGT	GCC	GCC	GTC	3120
Ser	Leu	Ala	Gly	Gly	Ile	Thr	Leu	Gly	Ala	Leu	Gly	Gly	Ala	Val		
																1025
																1030
																1040

+

FIG. 4J

+
GCT ATA CCT TTT GCA GTA GCA GAG CAG GCT AGA CTT AAT TAT GTC GCT 3168
Ala Ile Pro Phe Ala Val Ala Val Gln Ala Arg Leu Asn Tyr Val Ala 1045
1050
CTA CAA ACT GAT GTA TTG AAT AAA AAC CAA CAG ATC CTG GCT AAT GCT 3216
Leu Gln Thr Asp Val Leu Asn Lys Asn Gln Gln Ile Leu Ala Asn Ala 1060
1065
1070
TTC AAT CAA GCT ATT GGT AAC ATT ACA CAG GCT TTT GGT AAG GTT AAT 3264
Phe Asn Gln Ala Ile Gly Asn Ile Thr Gln Ala Phe Gly Lys Val Asn 1075
1080
1085
GAT GCT ATA CAT CAA ACA TCA CAA GGT CTT GCC ACT GTT GCT AAA GCG 3312
Asp Ala Ile His Gln Thr Ser Gln Gly Leu Ala Thr Val Ala Lys Ala 1090
1095
1100
TTG GCA AAA GTG CAA GAT GTT GTC AAC ACA CAA GGG CAA GCT TTA AGT 3360
Leu Ala Lys Val Gln Asp Val Val Asn Thr Gln Gln Ala Leu Ser 1105
1110
1115
CAC CTT ACA GTA CAA TTG CAA AAT ATT TTT CAA GCC ATT AGT AGT TCT 3408
His Leu Thr Val Gln Leu Gln Asn Asn Phe Gln Ala Ile Ser Ser Ser 1120
1125
1130
1135
ATT AGT GAT ATT TAT AAC AGG CTT GAC GAA CTG AGT GCT GAT GCA CAA 3456
Ile Ser Asp Ile Tyr Asn Arg Leu Asp Glu Leu Ser Ala Asp Ala Gln 1140
1145
1150
1155
GTT GAT AGG CTG ATT ACA GGT AGA CTT ACA GCA CTT AAT GCA TTT GTG 3504
Val Asp Arg Leu Ile Thr Gly Arg Leu Thr Ala Leu Asn Ala Phe Val 1160
1165

FIG. 4K

+
TCT CAG ACT CTA ACC AGA CAA GCA GAG GTT AGG GCT AGT AGA CAA CTT 3552
Ser Gln Thr Leu Thr Arg Gln Ala Glu Val Arg Ala Ser Arg Gln Leu 1170

GCC AAA GAC AAG GTT AAT GAA TGT GTT AGG TCT CAG TCT CAG AGA TTC 3600
Ala Lys Asp Lys Val Asn Glu Cys Val Arg Ser Gln Ser Gln Arg Phe 1185

GGA TTC TGT GGT AAT GGT ACA CAT TTG TCA CTA GCA AAT GCA GCA 3648
Gly Phe Cys Gly Asn Gly Thr His Leu Phe Ser Leu Ala Asn Ala Ala 1190

CCA AAT GGC ATG ATT TTC TTT CAT ACA GTA CTA TTA CCA ACA GCT TAT 3696
Pro Asn Gly Met Ile Phe Phe His Thr Val Leu Leu Pro Thr Ala Tyr 1205

GAA ACT GTA ACA GCT TGG TCA GGT ATT TGT GCT TCA GAT GGC GAT CGC 3744
Glu Thr Val Ala Trp Ser Gly Ile Cys Ala Ser Asp Gly Asp Arg 1220

ACT TTC GGA CTT GTC GTT AAA GAT GTG CAG TTG ACG TTG TTT CGT AAT 3792
Thr Phe Gly Leu Val Val Lys Asp Val Gln Leu Thr Leu Phe Arg Asn 1235

CTA GAT GAC AAG TTC TAT TTG ACC CCC AGA ACT ATG TAT CAG CCT AGA 3840
Leu Asp Asp Lys Phe Tyr Leu Thr Pro Arg Thr Met Tyr Gln Pro Arg 1250

GTT GCA ACT AGT TCT GAT TTT GTT CAA ATT GAA GGG TGT GAT GTG TTG 3888
Val Ala Thr Ser Ser Asp Phe Val Gln Ile Glu Gly Cys Asp Val Leu 1265

TTT GTC AAC GCG ACT GTA ATT GAT TTG CCT AGT ATT ATA CCT GAC TAT 3936
Phe Val Asn Ala Thr Val Ile Asp Ile Pro Ser Ile Ile Pro Asp Tyr 1290
1300

FIG. 4L

ATT GAC ATT AAT CAA ACT GTT CAA GAC ATA TTA GAA AAT TAC AGA CCA 3984	Ile Asp Ile Asn Gln Thr Val Gln Asp Ile Leu Glu Asn Tyr Arg Pro 1315	1320	1325
AAC TGG ACT GTA CCT GAA TTT ACA CTT GAT ATT TTC AAC GCA ACC TAT 4032	Asn Trp Thr Val Pro Glu Phe Thr Leu Asp Ile Phe Asn Ala Thr Tyr 1330	1335	1340
TTA AAT CTG ACT CGT GAA ATT GAT GAC TTA GAG TTT AGG TCA GAA AAG 4080	Leu Asn Leu Thr Gly Glu Ile Asp Asp Leu Glu Phe Arg Ser Glu Lys 1345	1350	1355
CTA CAT AAC ACT ACA GTA GAA CTT GCC ATT CTC ATT GAT ACC ATT AAT 4128	Leu His Asn Thr Thr Val Glu Leu Ala Ile Leu Ile Asp Thr Ile Asn 1355	1360	1370
AAT ACA TTA GTC AAT CTT GAA TGG CTC AAT AGA ATT GAA ACT TAT GTA 4176	Asn Thr Leu Val Asn Leu Glu Trp Leu Asn Arg Ile Glu Thr Tyr Val 13BO	1385	1390
AAA TGG CCT TGG TAT GTG TGG CTA CTG ATA GGT CTA GTA GTA TTG 4224	Lys Trp Pro Trp Tyr Val Trp Leu Leu Ile Gly Leu Val Val Val Phe 1395	1400	1405
TGC ATA CCA TTA CTG CTA TTT TGC TGT TTT AGC ACA GGT TGT TGT GGA 4272	Cys Ile Pro Leu Leu Phe Cys Cys Phe Ser Thr Gly Cys Cys Gly 1410	1415	1420
TGC ATA GGT TGT TTA GGA AGT TGT CAC TCT ATA TGT AGT AGA AGA 4320	Cys Ile Gly Cys Leu Gly Ser Cys Cys His Ser Ile Cys Ser Arg Arg 1425	1430	1435
CAA TTT GAA TAT TAT GAA CCA ATT GAA AAA GTG CAT GTC CAC 4362	Gln Phe Glu Tyr Glu Pro Ile Glu Lys Val His Val His 1445	1450	1455

TAA

4365

FIG. 5A

TS FIPV, nucleotides 1- 4365 [SEQ ID NO: 25]
TS FIPV, amino acids 1- 1454 [SEQ ID NO: 26]

**TS-BP, nucleotides* 1- 2246 [SEQ ID NO:27]
TS-BP, amino acids* 1- 748 [SEQ ID NO:28]**

ATG	ATT	GTG	CTC	GTA	ACT	TGC	CTC	TTG	TTG	TTA	TGT	TCA	TAC	CAC	ACA	48.
Met	Ile	Val	Leu	Val	Thr	Cys	Leu	Leu	Leu	Cys	Ser	Tyr	His	Thr		
1					5						10					15
GTT	TTG	AGT	ACA	ACA	AAT	AAT	GAA	TGC	ATA	CAA	GTT	AAC	GTT	ACA	CAA	96
Val	Leu	Ser	Thr	Thr	Asn	Asn	Glu	Cys	Ile	Gln	Val	Asn	Val	Thr	Gln	
					20				25							30
TTG	GCT	GGC	AAT	GAA	AAC	CTT	ATC	AGA	GAT	TTT	CTG	TTT	AGT	AAC	TTT	144
Leu	Ala	Gly	Asn	Glu	Asn	Leu	Ile	Arg	Asp	Phe	Leu	Phe	Ser	Asn	Phe	
					35				40							45
AAA	GAA	GAA	GGA	AGT	GTA	GTT	GTT	GGT	TAT	TAC	CCT	ACA	GAG	GTG	192	
Lys	Glu	Glu	Gly	Ser	Val	Val	Val	Gly	Gly	Tyr	Tyr	Pro	Thr	Glu	Val	
					50			55			60					
TGG	TAC	AAC	TGC	TCT	AGA	ACA	GCT	CGA	ACT	ACT	GCC	TTT	CAG	TAT	TTT	240
Trp	Tyr	Asn	Cys	Ser	Arg	Thr	Ala	Arg	Thr	Thr	Ala	Phe	Gln	Tyr	Phe	
					65			70			75					80
AAT	AAT	ATA	CAT	GCC	TTT	TAT	TTT	GTT	ATG	GAA	GCC	ATG	GAA	AAT	AGC	288
Asn	Asn	Ile	His	Ala	Phe	Tyr	Phe	Val	Met	Glu	Ala	Met	Glu	Asn	Ser	
					85				90							95

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FIG. 5B

ACT GGT AAT GCA CGT GGT AAA CCA TTA TTA TTT CAT GTG CAT GGT GAG 336
 Thr Gly Asn Ala Arg Gly Lys Pro Leu Phe His Val His Gly Glu
 105
 ↑
 100
 97 of WSU 1146
 FIPV in 58-3
 corresponds to amino acid #62 of AR58-3

CCT	GTT	AGT	ATT	ATA	TAT	ATA	TCG	GCT	TAT	AGG	GAT	GAT	GTG	CAA	384
Pro	Val	Ser	Val	Ile	Ile	Tyr	Ile	Ser	Ala	Tyr	Arg	Asp	Asp	Val	Gln
115							120							125	

CAA AGG CCC CTT TTA AAA CAT GGG TTA GTG TGC ATA ACT AAA AAT CGC 432
 Gln Arg Pro Leu Leu Lys His Gly Leu Val Cys Ile Thr Lys Asn Arg
 130
 135

CAT	ATT	AAC	TAT	GAA	CAA	TTC	ACC	TCC	AAC	CAG	TGG	AAT	TCC	ACA	TGT	480
His	Ile	Asn	Tyr	Glu	Gln	Pho	Thr	Ser	Asn	Gln	Trp	Asn	Ser	Thr	Cys	
145				150	↑										160	

AR58-3
 a.a. #116
 a.a. #118

ACG	GGT	GCT	GAC	AGA	AAA	ATT	CCT	TTC	TCT	GTC	ATA	CCC	ACG	GAC	AAT	528
Thr	Gly	Ala	Asp	Arg	Lys	Ile	Pro	Phe	Ser	Val	Ile	Pro	Thr	Asp	Asn	
										170					175	

GGA ACA AAA ATC TAT GGT CTT GAG TGG AAT GAT GAC TTT GTT ACA GCT 576
 Gly Thr Lys Ile Tyr Gly Leu Glu Tyr Asn Asp Asp Phe Val Thr Ala
 180
 185
 190

FIG. 5C

TAT	ATT	AGT	GGT	CGT	TCT	TAT	CAC	TTG	AAC	ATC	AAT	ACT	AAT	TGG	TTT	624
Tyr	Ile	Ser	Gly	Ara	Ser	Tyr	His	Leu	Asn	Ile	Asn	Thr	Asn	Trp	Phe	
195							200									205
AAC	AAT	GTC	ACA	CTT	TTG	TAT	TCA	CGC	TCA	AGC	ACT	GCT	ACC	TGG	GAA	672
Asn	Asn	Val	Thr	Leu	Leu	Tyr	Ser	Ara	Ser	Ser	Thr	Ala	Thr	Trp	Glu	
210							215									220
TAC	AGT	GCT	GCA	TAT	GCT	TAC	CAA	GGT	GTT	TCT	AAC	TTC	ACT	TAT	TAC	720
Tyr	Ser	Ala	Ala	Tyr	Ala	Tyr	Gln	Gly	Val	Ser	Asn	Phe	Thr	Tyr	Tyr	
225							230									235
AAG	TTA	AAT	AAC	ACC	AAT	GGT	CTA	AAA	ACC	TAT	GAA	TTA	TGT	GAA	GAT	768
Lys	Leu	Asn	Asn	Thr	Asn	Gly	Leu	Lys	Thr	Tyr	Glu	Leu	CYS	Glu	Asp	
																250
TAT	GAA	CAT	TGC	ACT	GGC	TAT	GCT	ACC	AAT	GTA	TTT	GCT	CCG	ACA	TCA	816
Tyr	Glu	His	Cys	Thr	Gly	Tyr	Ala	Thr	Asn	Val	Phe	Ala	Pro	Thr	Ser	
																265
GGT	GGT	TAC	ATA	CCT	GAT	GGA	TTT	AGT	TTT	AAT	TGG	TTC	TTC	TTG	CTT	864
Gly	Gly	Tyr	Ile	Pro	Asp	Gly	Phe	Ser	Phe	Asn	Asn	Trp	Phe	Leu	Leu	
																275
ACA	AAT	AGT	TCC	ACT	TTT	GTT	AGT	GGC	AGG	TTT	GTA	ACA	AAT	CAA	CCA	912
Thr	Asn	Ser	Ser	Thr	Phe	Val	Ser	Gly	Arg	Phe	Val	Thr	Asn	Gln	Pro	
																290
																300

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FIG. 5D

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FIG. 5E

FIG. 5F

ACA	CTA	CCA	ATG	CAG	GAT	AAC	AAT	ACT	GAT	GTG	TAC	TGT	ATT	CGT	TCT	1728
Thr	Leu	Pro	Met	Gln	Asp	Asn	Asn	Thr	Asp	Val	Tyr	Cys	Ile	Arg	Ser	
																575
AAC	CAA	TTC	TCA	GTT	TAT	CAT	TCC	ACT	TGC	AAA	AGT	TCT	TTA	TGG	1776	
Asn	Gln	Phe	Ser	Val	Tyr	Val	His	Ser	Thr	Cys	Lys	Ser	Ser	Leu	Trp	
																590
GAC	AAT	ATT	TTT	AAT	CAA	GAC	TGC	ACG	GAT	GTT	TTA	GAG	GCT	ACA	GCT	1824
ASP	Asn	Ile	Phe	Asn	Gln	Asp	Cys	Thr	Asp	Val	Leu	Glu	A1a	Thr	Ala	
																605
GTT	ATA	AAA	ACT	GGT	ACT	TGT	CCT	TTC	TCA	TTT	GAT	AAA	TTG	AAC	AAT	1872
Val	Ile	Lys	Thr	Gly	Thr	Cys	Pro	Phe	Ser	Phe	Asp	Lys	Leu	Asn	Asn	
																620
TAC	TTG	ACT	TTT	AAC	ACG	TTC	TGT	TTG	TCG	TTG	AGT	CCT	GTG	GGT	GCT	1920
Tyr	Leu	Thr	Phe	Asn	Thr	Phe	Cys	Leu	Ser	Leu	Ser	Pro	Val	Gly	Ala	
																640
AAT	TGC	AAG	TTT	GAT	GTT	GCT	GCA	CGT	ACA	AGA	ACC	AAT	GAG	CAG	GTT	1968
Asn	Cys	Lys	Phe	Asp	Val	Ala	Ala	Arg	Thr	Arg	Thr	Asn	Glu	Gln	Val	
																655
GTT	AGA	AGT	CTA	TAT	ATA	TAT	GAA	GAA	GGA	GAC	AAC	ATA	GTG	GGT	2016	
Val	Arg	Ser	Leu	Tyr	Ile	Ile	Tyr	Glu	Glu	G1y	Asp	Asn	Ile	Val	Gly	
																670

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FIG. 5G

Val	Pro	CCG	TCT	GAT	AGC	GGT	CTG	CAC	GAT	TTG	TCT	GTG	CTA	CAC	CTA	2064
Asp	Ser	Asp	Asp	Ser	Gly	Leu	His	Asp	Leu	Ser	Val	Leu	His	Ile		
		675				680					685					
GAC	TCC	TGT	ACA	GAT	TAC	AAT	ATA	TAT	GGT	AGA	ACT	GGT	GTT	GGT	ATT	2112
Asp	Ser	Cys	Thr	Asp	Tyr	Asn	Ile	Tyr	Gly	Arg	Thr	Gly	Val	Gly	Ile	
		690				695					700					
ATT	AGA	CGA	ACT	AAC	AGT	ACG	CTA	CTT	AGT	GGC	TTA	TAT	TAC	ACA	TCA	2160
Ile	Arg	Arg	Thr	Asn	Ser	Thr	Leu	Leu	Ser	Gly	Leu	Tyr	Tyr	Thr	Ser	
		705				710					715					720
CTA	TCA	GGT	GAT	TTG	TTA	GGC	TTT	AAA	AAT	GTT	AGT	GAT	GGT	GTC	ATT	2208
Leu	Ser	Gly	Asp	Leu	Leu	Gly	Phe	Lys	Asn	Val	Ser	Asp	Gly	Val	Ile	
						725					730					735
TAT	TCT	GTG	ACG	CCA	TGT	GAT	GTA	AGC	GCA	CAA	GCG	GCT	GTT	ATT	GAT	2256
Tyr	Ser	Val	Thr	Pro	Cys	Asp	Val	Ser	Ala	Gln	Ala	Ala	Val	Ile	ASP	
						740					745					750
GGT	GCC	ATA	GTT	GGA	GCT	ATG	ACT	TCC	ATT	AAC	AGT	GAA	CTG	TTA	GGT	2304
Gly	Ala	Ile	Val	Gly	Ala	Met	Thr	Ser	Ile	Asn	Ser	Glu	Leu	Leu	Gly	
						755					760					765
CTA	ATA	CAT	TGG	ACA	ACG	ACA	CCT	AAT	TTT	TAT	TAC	TCT	ATA	TAT	2352	
Leu	Ile	His	Trp	Thr	Thr	Thr	Pro	Asn	Phe	Tyr	Tyr	Tyr	Ser	Ile	Tyr	
						770					775					780
AAT	TAC	ACA	AGT	GAG	AGG	ACT	CGT	GGC	ACT	GCA	ATT	GAC	AGT	AAC	GAT	2400
Asn	Tyr	Thr	Ser	Glu	Glu	Arg	Thr	Arg	Gly	Thr	Ala	Ile	Asp	Ser	Asn	Asp
						785					790					800

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FIG. 5H

FIG. 5I

+
GAA AAT TTA GAT CCT ATT TAC AAA GAA TGG CCT AGC ATA GGT GGT TCT 2832
Glu Asn Leu Asp Pro Ile Tyr Lys Glu Trp Pro Ser Ile Gly Gly Ser
930 935 940

TGG CTA GGA GGT CTA AAA GAT ATA CTA CCG TCC CAT AAT AGC AAA CGT 2880
Trp Leu Gly Gly Leu Lys Asp Ile Leu Pro Ser His Asn Ser Lys Arg
945 950 955 960

AAG TAT GGT TCT GCT ATA GAA GAT TTG CTT GAT AAA GTT GTA ACA 2928
Lys Tyr Gly Ser Ala Ile Glu Asp Leu Leu Phe Asp Lys Val Val Thr
965 970 975

TCT GGT TTA GGT ACA GTC GAT GAA GAT TAT AAA CGT TGT ACT GGT GGT 2976
Ser Gly Leu Gly Thr Val Asp Glu Asp Tyr Lys Arg Cys Thr Gly Gly
980 985 990

TAC GAC ATA GCA GAC TTG TGT GCT CAA TAT TAC AAT GGC ATC ATG 2976
Tyr Asp Ile Ala Asp Leu Val Cys Ala Gln Tyr Tyr Asn Gly Ile Met
995 1000 1005

GTT CTA CCA GGT GTA GCT AAT GCT GAC AAG ATG ACT ATG TAC ACA GCA 3072
Val Leu Pro Gly Val Ala Asn Ala Asp Lys Met Thr Met Tyr Thr Ala
1010 1015 1020

TCA CTT GCA GGT GGT ATA ACA TTA GGT GCA CTT GGT GGC GCC GTG 3120
Ser Leu Ala Gly Ile Thr Leu Gly Ala Leu Gly Gly Ala Val
1025 1030 1035 1040

GCT ATA CCT TTT GCA GTA GCA GTC CAG GCT AGA CTT AAT TAT GTT GCT 3168
Ala Ile Pro Phe Ala Val Ala Val Gln Ala Arg Leu Asn Tyr Val Ala
1045 1050 1055

FIG. 5J

CTA CAA ACT GAT GTA TTG AAT AAA AAC CAA CAG ATC CTG GCT AAT GCT 3216
Leu Gln Thr Asp Val Leu Asn Lys Asn Gln Gln Ile Leu Ala Asn Ala 1060 1065 1070

TTC AAT CAA GCT ATT GGT AAC ATT ACA CAG GCT TTT GGT AAG GTT AAT 3264
Phe Asn Gln Ala Ile Gly Asn Ile Thr Gln Ala Phe Gly Lys Val Asn 1075 1080 1085

GAT GCT ATA CAT CAA ACA TCA CAA GGT CTT GCC ACT GTT GCT AAA GCG 3312
Asp Ala Ile His Gln Thr Ser Gln Gly Leu Ala Thr Val Ala Lys Ala 1090 1095 1100

TTG GCA AAA GTG CAA GAT GTT GTC AAC ACA CAA GGG CAA GCT TTA AGT 3360
Leu Ala Lys Val Gln Asp Val Val Asn Thr Gln Gly Gln Ala Leu Ser 1105 1110 1115 1120

CAC CTG ACA GTA CAA TTG CAA AAT ATT TTT CAA GCC ATT AGT AGT TCT 3408
His Leu Thr Val Gln Leu Gln Asn Asn Phe Gln Ala Ile Ser Ser Ser 1125 1130 1135

ATT AGT GAT ATT TAT AAC AGG CTT GAC GAA CTG AGT GCT GCA CAA 3456
Ile Ser Asp Ile Tyr Asn Arg Leu Asp Glu Leu Ser Ala Asp Ala Gln 1140 1145 1150

GTT GAT AGG CTG ATT ACA GGT AGA CTT ACA GCA CTT AAT GCA TTT GTG 3504
Val Asp Arg Leu Ile Thr Gly Arg Leu Thr Ala Leu Asn Ala Phe Val 1155 1160 1165

TCT CAG ACT CTA ACC AGA CAA GCA GAG GTT AGG GCT AGT AGA CAA CTT 3552
Ser Gln Thr Leu Thr Arg Gln Ala Glu Val Arg Ala Ser Arg Gln Leu 1170 1175 1180

FIG. 5K

GCC	AAA	GAC	AAG	GTT	AAT	GAA	TGT	GTT	AGG	TCT	CAG	TCA	AGA	TTC	3600	
Ala	Lys	Asp	Lys	Val	Asn	Glu	Cys	Val	Arg	Ser	Gln	Ser	Gln	Arg	Phe	
1185										1195					1200	
GGA	TTC	TGT	GGT	AAT	GGT	ACA	CAT	TTG	TTT	TCA	GCA	AAT	GCA	GCA	3648	
Gly	Phe	Cys	Gly	Asn	Gly	Thr	His	Leu	Phe	Ser	Leu	Ala	Asn	Ala	Ala	
										1210					1215	
CCA	AAT	GGC	ATG	ATT	TTC	TTT	CAT	ACA	GTA	CTA	TTA	CCA	ACA	GCT	TAT	3696
Pro	Asn	Gly	Met	Ile	Phe	Phe	His	Thr	Val	Leu	Leu	Pro	Thr	Ala	Tyr	
										1225					1230	
GAA	ACT	GTA	ACA	GCT	TGG	TCA	GGT	ATT	TGT	GCT	TCA	GAT	GGC	GAT	CGC	3744
Glu	Thr	Val	Thr	Ala	Trp	Ser	Gly	Ile	Cys	Ala	Ser	Asp	Gly	Asp	Arg	
										1240					1245	
ACT	TTC	GGA	CTT	GTC	GTT	AAA	GAT	GTG	CAG	TTG	ACG	TTG	TTT	CGT	AAT	3792
Thr	Phe	Gly	Leu	Val	Val	Lys	Asp	Val	Gln	Leu	Thr	Leu	Phe	Arg	Asn	
										1255					1260	
CTA	GAT	GAC	AAG	TTC	TAT	TTG	ACC	CCC	AGA	ACT	ATG	TAT	CAG	CCT	AGA	3840
Leu	Asp	Asp	Lys	Phe	Tyr	Leu	Thr	Pro	Arg	Thr	Met	Tyr	Gln	Pro	Arg	
										1270					1275	
GTT	GCA	ACT	AGT	TCT	GAT	TTT	GTT	CAA	ATT	GAA	GGG	TGT	GAT	GTG	TTG	3888
Val	Ala	Thr	Ser	Ser	Asp	Phe	Val	Gln	Ile	Glu	Gly	Cys	Asp	Val	Leu	
										1285					1290	
TTC	GTC	AAC	GAG	ACT	GTA	ATT	GAT	TTG	CCT	AGT	ATT	ATA	CCT	GAC	TAT	3936
Phe	Val	Asn	Ala	Thr	Val	Ile	Asp	Leu	Pro	Ser	Ile	Ile	Pro	Asp	Tyr	
										1300					1310	

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FIG. 5L

+
ATT GAC ATT AAT CAA ACT GTT CAA GAC ATA TTA GAA AAT TAC AGA CCA 3984
Ile Asp Ile Asn Gln Thr Val Gln Asp Ile Leu Glu Asn Tyr Arg Pro 1325
1315
1320

AAC TGG ACT GTA CCT GAA TTT ACA CTT GAT ATT TTC AAC ACA ACC TAT 4032
Asn Trp Thr Val Pro Glu Phe Thr Leu Asp Ile Phe Asn Thr Thr Tyr 1340
1330
1335

TAA AAT CTG ACT GGT GAA ATT GAT GAC TTA GAG TTT AGG TCG GAA AAG 4080
Leu Asn Leu Thr Gly Glu Ile Asp Asp Leu Glu Phe Arg Ser Glu Lys 1360
1345
1350
1355

CTA CAT AAC ACT ACA GTA GAA CTT GCC ATT CTC ATT GAT AAC ATT AAT 4128
Leu His Asn Thr Thr Val Glu Leu Ala Ile Leu Ile Asp Asn Ile Asn 1375
1365
1370
1375

AAT ACA TTA GTC AAT CTT GAA TGG CTC AAT AGA ATT GAA ACT TAT GTA 4176
Asn Thr Leu Val Asn Leu Glu Trp Leu Asn Arg Ile Glu Thr Tyr Val 1390
1380
1385

AAA TGG CCT TGG TAT GTG TGG CTA CTG ATA GGT TTA GTA GTA GTA TTT 4224
Lys Trp Pro Trp Tyr Val Trp Leu Leu Ile Gly Leu Val Val Val Phe 1405
1395
1400

TGC ATA CCA TTA CTG CTA TTT TGC TGT TTT AGC ACA GGT TGT TGT GGA 4272
Cys Ile Pro Leu Leu Phe Cys Cys Phe Ser Thr Gly Cys Cys Gly 1420
1410
1415

TGC ATA GGT TGT TTA GGA AGT TGT CAC TCT ATA TGT AGT AGA AGA 4320
Cys Ile GLY Cys Leu GLY Ser Cys Cys His Ser Ile Cys Ser Arg Arg 1440
1425
1430
1435

CAA TTT GAA AAT TAT GAA CCA ATT GAA AAA GTG CAT GTC CAC 4362
Gln Phe Glu Asn Tyr Glu Pro Ile Glu Lys Val His Val His 1450
1445

TN406, nucleotides 302 - 671 [SEQ ID NO:29]
 TN406, amino acids 102 - 223 [SEQ ID NO:30]
 GT GCT AAA CCA TTA TTA TTT CAT GTG CAT GAG CCT 339
 GLY Lys Pro Leu Pro His Val His GLY GLU Pro
 102 106 111
 GTT AGT GTT ATT ATA TAT ATA TCG GCT TAT AGG GAT 378
 Val Ser Val Ile Tyr Ile Ser Ala Tyr Arg Asp Asp
 116 121 126
 GTG CAA CAA AGG CCC CTT TTA AAA CAT GGG TTA GTG TGC 417
 Val GLN GLN Arg Pro Leu Leu Lys His GLY Leu Val Cys
 141 146 151
 ATA ACT AAA ATT CGC CAT ATT AAC TAT GAA CAA TTC ACC 456
 Ile Thr Lys Asn Arg His Ile Asn Tyr GLN Pro Thr
 Ser Asn GLN Trp Asn Ser Thr CYS Thr GLY Ala Asp Arg
 TCC AAC CAG TGG ATT.TCC ACA TGT ACG GGT GCT GAC AGA 495
 AAA ATT CCT TTC TCT GTC ATA CCC ACG GAC ATT GGA ACA 534
 Lys Ile Pro Phe Ser Val Ile Pro Thr Asp Asn GLY Thr
 AAA ATT GAT GGT CGT TCT TAT CAC TTG AAC ATC ATT 612
 GCT TAT ATT AGT GGT CGT TCT TAT CAC TTG AAC ATC ATT 651
 Thx Asn Trp Phe Asn Asn Val Thr Leu Leu Tyr Ser Arg
 206 211 216
 ACT ATT TGG TTT ACC ATT GTC ACA CCT TTG TAT TCA CGC 671
 Ser Ser Ile Ala Thr Trp
 221

FIG. 7A

FECV, Nucleotides 1- 4365 [SEQ ID NO:31]
 FECV, amino acids 1- 1454 [SEQ ID NO:32]

ATG	ATT	GTG	CTC	GTA	ACT	TGC	CTC	TTG	TTA	TGC	TGC	TAC	CAC	ACT	48
Met	Ile	Val	Leu	Val	Thr	Cys	Leu	Leu	Leu	Cys	Ser	Tyr	Tyr	His	Thr
1	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
GTT	TCG	AGT	ACG	TCA	AAC	AAT	GAT	TGT	AGA	CAA	GTT	AAC	GTA	ACA	96
Val	Ser	Ser	Thr	Ser	Asn	Asn	Asp	Cys	Arg	Gln	Val	Asn	Val	Thr	Gln
1	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
TTA	GCT	GGC	AAT	GAA	AAC	CTT	ATT	AGA	GAC	TTT	TTG	TTG	CAA	AGT	144
Leu	Ala	Gly	Asn	Glu	Ile	Asn	Leu	Ile	Arg	Asp	Phe	Leu	Phe	Gin	Ser
35	40	45	50	55	60	65	70	75	80	85	90	95	100	110	1146
AAA	GAA	GAA	GGG	ATT	GTA	GTT	GTT	GGT	TAT	TAC	CCT	ACA	GAG	GTG	192
Lys	Glu	Glu	Gly	Ile	Val	Val	Gly	Gly	Tyr	Tyr	Pro	Thr	Glu	Val	192
50	55	60	65	70	75	80	85	90	95	100	110	1146	1146	1146	
TGG	TAC	AAC	TGC	TCT	AGA	ACA	GCA	ACT	ACC	ACT	GCC	TAT	GAG	TAT	240
Trp	Tyr	Asn	Cys	Ser	Arg	Thr	Ala	Thr	Thr	Thr	Ala	Tyr	Glu	Tyr	240
65	70	75	80	85	90	95	100	110	1146	1146	1146	1146	1146	1146	1146
AAT	AAT	ATA	CAT	GCC	TTT	TAT	TTT	GAT	ATG	GAA	GCT	ATG	GAA	AAT	288
Asn	Asn	Ile	His	Ala	Phe	Tyr	Phe	Asp	Met	Glu	Ala	Met	Glu	Asn	288
85	90	95	100	110	1146	1146	1146	1146	1146	1146	1146	1146	1146	1146	1146
ACT	GGT	AAT	GCA	CGT	GGT	AAA	CCT	CTA	TTA	TTT	CAT	GTT	CAT	GGT	336
Thr	Gly	Asn	Ala	Arg	Gly	Lys	Pro	Leu	Leu	Phe	His	Val	His	Gly	336
97	of WSU	1146	amino acid	#62	of AR58-3	97	of WSU	1146	amino acid	#62	of AR58-3	97	of WSU	1146	amino acid

FIG. 7B

CCT	GTT	AGT	ATC	ATC	ATA	TAT	ATA	TCA	GCT	TAT	GGG	GAT	GTG	CAA	384	
Pro	Val	Ser	Ile	Ile	Ile	Tyr	Ile	Ser	Ala	Tyr	Gly	Asp	Asp	Val	Gln	
115							120								125	
CAA	AGG	CCA	CTT	TTA	GAA	CAT	GGG	TTA	TTG	TGC	ATT	ACT	AAA	AAT	CGC	432
Gln	Arg	Pro	Leu	Leu	Glu	His	Gly	Leu	Leu	Cys	Ile	Thr	Lys	Asn	Arg	
130							135					140				140
AAT	ATT	GAC	TAT	AAC	ACC	TTC	ACC	AGC	AAC	CAG	TGG	GAT	TCC	ATA	TGT	480
Asn	Ile	Asp	Tyr	Asn	Thr	Phe	Thr	Ser	Asn	Gln	Trp	Asp	Ser	Ile	Cys	
145							150					155				160
ACG	GGT	AAT	GAC	AGA	AAA	ATT	CCT	TTC	TCT	GTC	ATA	CCC	AGG	GAT	AAT	528
Thr	Gly	Asn	Asp	Arg	Lys	Ile	Pro	Phe	Ser	Val	Ile	Pro	Arg	Asp	Asn	
											170					175
GGA	ACA	AAA	ATC	TAT	GGG	CTT	GAG	TGG	AAT	GAT	GAA	TTT	GTT	ACA	GCG	576
Gly	Thr	Lys	Ile	Tyr	Gly	Leu	Glu	Trp	Asn	Asp	Glu	Phe	Val	Thr	Ala	
												185				190
TAT	ATT	AGT	GGT	CGT	TCT	TAT	AAT	TGG	AAC	ATC	AAT	AAT	AAC	TGG	TTT	624
Tyr	Ile	Ser	Gly	Arg	Ser	Tyr	Asn	Trp	Asn	Ile	Asn	Asn	Asn	Trp	Phe	
											200					205
AAC	AAT	GTC	ACA	CTT	TTG	TAT	TCA	CGC	TCA	AGC	ACT	GCT	ACC	TGG	GAA	672
Asn	Asn	Val	Thr	Leu	Leu	Tyr	Ser	Arg	Ser	Ser	Thr	Ala	Thr	Trp	Glu	
210													220			

FIG. 7C

TAC	AGT	GCT	GCA	TAT	GTT	TAC	CAA	GGT	GTT	TCT	AAC	TTC	ACT	TAT	TAC	720
Tyr	Ser	Ala	Ala	Tyr	Val	Tyr	Gln	Gly	Val	Ser	Asn	Phe	Thr	Tyr	Tyr	240
225				230				235								
AAG	TTA	AAT	AAC	ACC	AAT	GGT	TTA	AAA	ACC	TAT	GAA	TTT	TGT	GAG	GAT	768
Lys	Leu	Asn	Asn	Thr	Asn	Gly	Leu	Lys	Thr	Tyr	Glu	Phe	Cys	Glu	Asp	255
				245				250	.							
TAT	GAA	TAT	TGC	ACT	GGC	TAC	GCC	ACT	AAT	GTC	TTT	GCT	CCA	ACT	GTG	816
Tyr	Glu	Tyr	Cys	Thr	Gly	Tyr	Ala	Thr	Asn	Val	Phe	Ala	Pro	Thr	Val	
				260				265				270				
GGA	GGT	TAC	ATA	CCT	GAT	GGA	TTT	AGT	TTT	AAC	AAT	TGG	TTT	TTG	CTT	864
Gly	Gly	Tyr	Ile	Pro	Asp	Gly	Phe	Ser	Phe	Asn	Asn	Trp	Phe	Leu	Leu	
				275				280				285				
ACA	AAT	AGC	TCC	ACT	TTT	CTT	AGT	GGC	AGA	TTT	GTA	ACA	AAC	CAA	CCA	912
Thr	Asn	Ser	Ser	Thr	Pro	Phe	Val	Ser	Gly	Arg	Phe	Val	Thr	Asn	Gln	Pro
				290				295				300				
CTA	TTA	GTT	AAC	TGC	TAA	TGG	CCA	GTC	CCC	AGT	TTT	GGT	GTA	GCA	GCA	960
Leu	Leu	Val	Asn	Cys	Leu	Trp	Pro	Val	Pro	Ser	Phe	Gly	Val	Ala	Ala	
				305				310			315			320		
CAA	GAA	TTT	TGT	TTT	GAA	GGT	GCG	CAG	TTT	AGT	CAG	TGT	AGT	GGT	GTA	1008
Gln	Glu	Phe	Cys	Phe	Glu	Gly	Ala	Gln	Phe	Ser	Gln	Cys	Ser	Gly	Val	
				325				330			335			335		
TCT	TTA	AAT	AAC	ACA	GTA	GAT	GTT	ATT	AGA	TTC	AAT	CTT	AAT	TTC	ACC	1056
Ser	Leu	Asn	Asn	Thr	Val	Asp	Val	Ile	Arg	Phe	Asn	Leu	Asn	Phe	Thr	
				340				345			350					

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FIG. 7D

FIG. 7E

FIG. 7F

GTT	ATA	AAG	ACT	GGT	ACT	TGT	CCT	TTC	TCA	TTT	GAT	AAA	TTG	AAC	AAT	1872
Val	Ile	Lys	Thr	Gly	Thr	Cys	Pro	Phe	Ser	Phe	Asp	Lys	Leu	Asn	Asn	
610						615					620					
TAC	TTA	ACT	TTT	AAC	AAG	TTC	TGT	TTC	TGC	TTC	AGT	CCT	GTT	GGC	GCT	1920
Tyr	Leu	Thr	Phe	Asn	Lys	Phe	Cys	Leu	Ser	Leu	Ser	Pro	Val	Gly	Ala	
625						630					635					640
AAC	TGC	AAG	TTT	GAT	GTt	GCC	GCA	CGT	ACA	AGA	ACC	ATF	GAG	CAA	GTT	1968
Asn	Cys	Lys	Phe	Asp	Val	Ala	Ala	Arg	Thr	Arg	Thr	Asn	Glu	Gln	Val	
						645					650					655
GTT	AGA	AGT	CTA	TAT	GTA	ATA	TAT	GAA	GAA	GGA	GAC	AAC	ATA	GTT	GGT	2016
Val	Arg	Ser	Leu	Tyr	Val	Ile	Tyr	Glu	Glu	Gly	Asp	Asn	Ile	Val	Gly	
						660					665					670
GTA	CCG	TCT	GAT	AAT	AGC	GGT	CTG	CAC	GAT	TTG	TCT	GTG	CTA	CAC	CTA	2064
Val	Pro	Ser	Asp	Asn	Ser	Gly	Leu	His	Asp	Leu	Ser	Val	Leu	His	Leu	
						675					680					685
GAC	TCC	TGT	ACA	GAG	TAT	AAT	ATA	TAT	GGT	AGA	ACT	GGT	GTT	GGT	ATT	2112
Asp	Ser	Cys	Thr	Glu	Tyr	Asn	Ile	Tyr	Gly	Arg	Thr	Gly	Val	Gly	Ile	
						690					695					700
ATT	AGA	CAA	ACT	AAC	AGT	ACG	CTA	CTT	AGC	GGC	TTA	TAT	TAC	ACA	TCA	2160
Ile	Arg	Gln	Thr	Asn	Ser	Thr	Leu	Leu	Ser	Gly	Leu	Tyr	Tyr	Thr	Ser	
705							710					715				720
CTA	TCA	GGT	GAT	TTG	TTA	GGC	TTT	AAA	AAT	GTT	AGT	GAT	GGT	GTC	ATC	2208
Leu	Ser	GLY	Asp	Leu	Leu	Gly	Phe	Lys	Asn	Val	Ser	Asp	GLY	Val	Ile	
							725					730				735

FIG. 7G

TAT	TCT	GTC	ACG	CCA	TGT	GAT	GTA	AGC	GCA	CAA	GCG	4CT	GTT	ATT	GAT	2256
Tyr	Ser	Val	Thr	Pro	Cys	Asp	Val	Ser	Ala	Gln	Ala	Ala	Val	Ile	Asp	750
740								745								
GGT	GCC	ATA	GTT	GGA	GCT	ATG	ACT	TCC	ATT	AAC	AGT	GAA	CTG	TVA	GGT	2304
Gly	Ala	Ile	Vai	Gly	Ala	Met	Thr	Ser	Ile	Asn	Ser	Glu	Leu	Leu	Gly	
755								760								
CTA	AAA	CAC	TGG	ACA	ACA	CCT	AAT	TTT	TAT	TAC	TAC	TCT	ATA	TAT	2352	
Leu	Lys	His	Trp.	Thr	Thr	Thr	Pro	Asn	Phe	Tyr	Tyr	Tyr	Ser	Ile	Tyr	
770							775					780				
AAT	TAT	ACA	AAT	GAG	AGG	ACT	CGT	GGC	ACT	GCA	ATT	GAC	AGT	AAC	GAT	2400
Asn	Tyr	Thr	Asn	Glu	Glu	Arg	Thr	Arg	Gly	Thr	Ala	Ile	Asp	Ser	Asn	Asp
785							790				795					800
GTT	GAT	TGT	GAA	CCT	ATC	ATA	ACC	TAT	TCT	AAC	ATA	GGT	GTT	TGT	AAA	2448
Val	Asp	Cys	Glu	Glu	Pro	Ile	Ile	Thr	Tyr	Ser	Asn	Ile	Gly	Val	Cys	Lys
								805				810				815
AAT	GGT	GCT	TTG	GTT	TTT	ATT	AAC	GTC	ACA	CAT	TCT	GAT	GGA	GAC	GTG	2496
Asn	Gly	Ala	Leu	Val	Phe	Ile	Asn	Val	Thr	His	Ser	Asp	Gly	Asp	Val	
								820				825				
CAA	CCA	ATT	AGC	ACT	GGT	ACT	GTC	ACG	ATA	CCT	ACA	AAC	TTT	ACC	ATA	2544
Gln	Pro	Ile	Ser	Thr	Gly	Thr	Val	Thr	Ile	Pro	Thr	Asn	Phe	Thr	Ile	
								835				840				845
TCT	GTG	CAA	GTC	GAA	TAC	ATT	CAG	GTT	ACC	CCT	ACA	CCA	GTA	TCA	ATA	2592
Ser	Val	Gln	Val	Glu	Tyr	Ile	Gln	Val	Tyr	Ile	Gln	Val	Thr	Pro	Val	
								850				855				860

+

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FIG. 7H

FIG. 7I

+
TAT GAC ATA GCC GAC TTA GTG TGT GCT CAA TAT TAC AAT GGC ATC ATG 3024
Tyr Asp Ile Ala Asp Leu Val Cys Ala Gln Tyr Tyr Asn Gly Ile Met 1005
995
GTG TTA CCT GGT GTA GCT AAT GAT GAC AAG ATG ACT ATG TAC ACA GCA 3072
Val Leu Pro Gly Val Ala Asn Asp Lys Met Thr Met Tyr Thr Ala 1020
1010
TCT CTT GCA GGT ATA ACA CTA GGT GCA CTT GGT GGT GCC GCC GTT 3120
Ser Leu Ala Gly Ile Thr Leu Gly Ala Leu Gly Gly Ala Val 1040
1025
1030
GCT ATA CCT TTT GCA GTA GCA GTT CAA GCT AGA CTT AAT TAT GTT GCT 3168
Ala Ile Pro Phe Ala Val Ala Val Gln Ala Arg Leu Asn Tyr Val Ala 1055
1045
CTA CAA ACT GAT GTA TTG AAT AAA AAC CAG CAG ATC CTG GCT AAT GCT 3216
Leu Gln Thr Asp Val Leu Asn Lys Asn Gln Gln Ile Leu Ala Asn Ala 1070
1060
TTC AAT CAA GCT ATT GGT AAC ATT ACA CAG GCA TTT GGC AAG GTT AAT 3264
Phe Asn Gln Ala Ile Gly Asn Ile Thr Gln Ala Phe GLY Lys Val Asn 1085
1075
GAT GCT ATA CAT CAA ACA TCA AAA GGT CTT GCA ACT GTT GCT AAA GCA 3312
Asp Ala Ile His Gln Thr Ser Lys Gly Leu Ala Thr Val Ala Lys Ala 1100
1090
TTG GCA AAA GTG CAA GAT GTT GTC AAC ACA CAA GGG CAA GCT TTA AGC 3360
Leu Ala Lys Val Gln Asp Val Val Asn Thr Gln Gly Gld Ala Leu Ser 1120
1105
1115

1

FIG. 7J

FIG. 7K

ACT	TTT	GGA	CTT	GTC	GTT	AAA	GAT	GTA	CAG	TTC	ACG	TTG	TTG	CGT	AAC	3792
Thr	Phe	Gly	Leu	Val	Val	Lys	Asp	Val	Gln	Leu	Thr	Leu	Phe	Arg	Asn	
1250						1255					1260					
CTA	GAT	GAC	AAG	TTC	TAT	TTG	ACT	CCC	AGA	ACT	ATG	TAT	CAG	CCT	AGA	3840
Leu	Asp	Asp	Lys	Phe	Tyr	Leu	Thr	Pro	Arg	Thr	Met	Tyr	Gln	Pro	Arg	
1265						1270					1275					1280
GCT	GCA	ACT	AGT	TCT	GAT	TTT	GTT	CAA	ATT	GAG	GGG	TGC	GAT	GTG	TTG	3888
Ala	Ala	Thr	Ser	Ser	Asp	Phe	Val	Gln	Ile	Glu	Gly	Cys	Asp	Val	Leu	
1285						1290					1295					
TTC	GTC	AAT	GCA	ACT	GTA	ATT	GAC	TTG	CCT	AGT	ATT	ATA	CCT	GAC	TAT	3936
Phe	Val	Asn	Ala	Thr	Val	Ile	Asp	Leu	Pro	Ser	Ile	Ile	Pro	Asp	Tyr	
1300						1305						1310				
ATT	GAC	ATC	AAT	CAG	ACT	GTT	CAA	GAT	ATA	TTA	GAA	AAT	TAC	AGA	CCA	3984
Ile	Asp	Ile	Asn	Gln	Thr	Vai	Gln	Asp	Ile	Leu	Glu	Asn	Tyr	Arg	Pro	
1315						1320					1325					
AAC	TGG	ACT	GTA	CCT	GAA	TTG	ACA	CTT	GAT	ATT	TTT	AAC	GCA	ACC	TAT	4032
Asn	Trp	Thr	Val	Pro	Glu	Ile	Asp	Leu	Thr	Leu	Asp	Ile	Phe	Asn	Ala	
1330						1335					1340					
TTA	AAT	CTG	ACT	GGT	GAA	ATT	GAT	GAC	TTA	GAA	TTT	AGG	TCA	GAA	AAG	4080
Leu	Asn	Leu	Thr	Gly	Glu	Ile	Asp	Asp	Leu	Glu	Phe	Arg	Ser	Glu	Lys	
1345						1350					1355					1360
CTA	CAC	AAT	ACC	ACT	GTA	GAA	CTT	GCC	ATT	CTC	ATT	GAC	AAC	ATT	AAC	4128
Leu	His	Asn	Thr	Thr	Val	Glu	Leu	Ala	Ile	Leu	Ile	Asp	Asn	Ile	Asn	
1365						1370					1375					

FIG. 7L

AAC ACA TTA GTC AAT CTT GAA TGG CTC AAT AGA ATT GAA ACT TAT GTA 4176
Asn Thr Leu Val Asn Leu Glu Trp Leu Asn Arg Ile Glu Thr Tyr Val 1380 1385 1390

AAA TGG CCT TGG TAT GTG TGG CTA CTA ATA GGC TTA GTA ATA TTT 4224
Lys Trp Pro Trp Tyr Val Trp Leu Leu Gly Leu Val Val Ile Phe 1395 1400 1405

TGC ATA CCA TTA TTG CTA TTT TGC TGT AGT ACA GGT TGT TGT GGA 4272
Cys Ile Pro Leu Leu Phe Cys Cys Ser Thr Gly Cys Cys Gly 1410 1415 1420

TGC ATA GGT TGC TTA GGA AGT TGT TGT CAC TCT ATG TGT AGT AGA AGA 4320
Cys Ile Gly Cys Leu Gly Ser Cys Cys His Ser Met Cys Ser Arg Arg 1425 1430 1435 1440

CAA TTT GAA AAT TAT GAA CCA ATT GAA AAA GTG CAT GTC CAC 4362
Gln Phe Glu Asn Tyr Glu Pro Ile Glu Lys Val His Val His 1445 1450

TAA 4365

FIG. 8

UCD-2', nucleotides 1- 377 [SEQ ID NO:53]
UCD-2', amino acids 1- 125 [SEQ ID NO:54]

AAT	GCT	CGT	GGT	AAA	CCA	TTA	TTA	TAT	GTC	CAT	GGT	GAG	CCT	GTT	48	
Asn	Ala	Arg	Gly	Lys	Pro	Leu	Leu	Phe	His	Val	His	Gly	Glu	Pro	Val	
1										10					15	
AGT	GTT	ATT	TAT	ATA	TCG	GCT	TAT	AGG	GAT	GTG	CAA	CAA	AGG	96		
Ser	Val	Ile	Ile	Tyr	Ile	Ser	Ala	Tyr	Arg	Asp	Asp	Val	Gln	Gln	Arg	
															30	
CCC	CTT	TTA	AAA	CAT	GGG	TTA	GTC	TGC	ATA	ACT	AAA	AAT	CGC	CAT	ATT	144
Pro	Leu	Leu	Lys	His	Gly	Leu	Val	Cys	Ile	Thr	Lys	Asn	Arg	His	Ile	
															45	
AAC	TAT	GAA	CAA	TTC	ACC	TCC	AAC	CAG	TGG	AAT	TCC	ACA	TGT	ACG	GGT	192
Asn	Tyr	Glu	Gln	Phe	Thr	Ser	Asn	Gln	Trp	Asn	Ser	Thr	Cys	Thr	Gly	
															60	
GCT	GAC	AGA	AAA	ATT	CCT	TTC	TCT	GTC	ATA	CCC	ACG	AAC	AAT	GGA	ACA	240
Ala	Asp	Arg	Lys	Ile	Pro	Phe	Ser	Val	Ile	Pro	Thr	Asp	Asn	Gly	Thr	
															75	
AAA	ATC	TAT	GGT	CTT	GAG	TGG	AAT	GAT	GAC	TTT	GTT	ACA	GCT	TAT	ATT	288
Lys	Ile	Tyr	Gly	Leu	Glu	Trp	Asn	Asp	Asp	Phe	Val	Thr	Ala	Tyr	Ile	
															95	
AGT	GGT	CGT	TCT	TAT	CAC	TTG	AAC	ATC	AAT	ACT	AAT	TGG	TTT	AAC	AAT	336
Ser	Gly	Arg	Ser	Tyr	His	Leu	Asn	Ile	Asn	Thr	Asn	Trp	Phe	Asn	Asn	
															110	
GTC	ACA	CTT	TTG	TAT	TCA	CGC	TCA	AGC	ACT	GCT	ACC	TGG	GA			377
Val	Thr	Leu	Leu	Tyr	Ser	Arg	Ser	Ser	Thr	Ala	Thr	Trp				125

FIG. 9A

Consensus Sequence
Nucleotides 1- 2246 [SEQ ID NO:33]
Amino acids 1- 748 [SEQ ID NO:34]

ATG ATT GTG CTC GTA ACT TGC CTC TTG TTA TGT TCA	39
Met Ile Val Leu Val Thr Cys Leu Leu Leu Cys Ser	10
TAC CAC ACA GTT TTG AGT ACA ACA AAT GAA TGC ATA	78
Tyr His Thr Val Leu Ser Thr Asn Asn Glu Cys Ile	25
CAA GTT AAC GAA CAA TTG GCT GGC AAT GAA AAC CTT	117
Gln Val Asn Val Thr Gln Leu Ala Gly Asn Glu Asn Leu	35
ATC AGA GAT TTT CTG TTT AGT AAC TTT AAA GAA GAA GGA	156
Ile Arg Asp Phe Leu Phe Ser Asn Phe Lys Glu Glu Gly	50
AGT GTA GTT GGT GGT TAT TAC CCT ACA GAG GTG TGG	195
Ser Val Val Val Gly Gly Tyr Tyr Pro Thr Glu Val Trp	65
TAC AAC TGC TCT AGA ACA GCT CGA ACT ACT GCC TTT CAG	234
Tyr Asn Cys Ser Arg Thr Ala Arg Thr Thr Ala Phe Gln	75
TAT TTT AAT AAT ATA CAT GCC TTT TAT TTT GTT ATG GAA	273
Tyr Phe Asn Asn Ile His Ala Phe Tyr Phe Val Met Glu	90
	85

1 5 15 20 30 40 55 70

FIG. 9B

GCC	ATG	GAA	AAT	AGC	ACT	GGT	AAT	GCA	CGT	GGT	AAA	CCA	312
Ala	Met	Glu	Asn	Ser	Thr	Gly	Asn	Ala	Arg	Gly	Lys	Pro	
													95
TTA	TTA	TTT	CAT	GTG	CAT	GGT	GAG	CCT	GTT	AGT	GTT	ATT	351
Leu	Leu	Phe	His	Val	His	Gly	Glu	Pro	Val	Ser	Val	Ile	
													105
ATA	TAT	ATA	TCG	GCT	TAT	AGG	GAT	GAT	GTG	CAA	CAA	AGG	390
Ile	Tyr	Ile	Ser	Ala	Tyr	Arg	ASP	ASP	Val	Gln	Gln	Arg	
													120
CCC	CTT	TTA	AAA	CAT	GGG	TTA	GTG	TGC	ATA	ACT	AAA	AAT	429
Pro	Leu	Leu	Lys	His	Gly	Leu	Val	Cys	Ile	Thr	Lys	Asn	
													135
CGC	CAT	ATT	AAC	TAT	GAA	CAA	TTC	ACC	TCC	AAC	CAG	TGG	468
Arg	His	Ile	Asn	Tyr	Glu	Gln	Phe	Thr	Ser	Asn	Gln	Trp	
													145
AAT	TCC	ACA	TGT	ACG	GGT	GCT	GAC	AGA	AAA	ATT	CCT	TTC	507
Asn	Ser	Thr	Cys	Thr	Gly	Ala	Asp	Arg	Lys	Ile	Pro	Phe	
													160
TCT	GTC	ATA	CCC	ACG	GAC	ATT	GGA	ACA	AAA	ATC	TAT	GGT	546
Ser	Val	Ile	Pro	Thr	Asp	Asn	Gly	Thr	Lys	Ile	Tyr	Gly	
													170
CTT	GAG	TGG	AAT	GAT	GAC	TTT	GTT	ACA	GCT	TAT	ATT	AGT	585
Leu	Glu	Trp	Asn	Asp	Asp	Phe	Val	Thr	Ala	Tyr	Ile	Ser	
													185
													190
													195

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FIG. 9C

Gly	Arg	TCT	CGT	TAT	CAC	TTG	AAC	ATC	AAT	ACT	AAT	TGG	TTT	624
Ser	Tyr	His	Tyr	Ile	Leu	Asn	Ile	Asn	Thr	Asn	Trp	Trp	Phe	205
		200												
AAC	AAT	GTC	ACA	CTT	TTG	TAT	TCA	CGC	TCA	AGC	ACT	GCT	663	
Asn	Asn	Val	Thr	Leu	Leu	Tyr	Ser	Arg	Ser	Ser	Thr	Ala		210
						215								220
ACC	TGG	GAA	TAC	AGT	GCT	GCA	TAT	GCT	TAC	CAA	GGT	GTT	702	
Thr	Trp	Glu	Tyr	Ser	Ala	Ala	Tyr	Ala	Tyr	Gln	Gly	Val		225
										230				
TCT	AAC	TTC	ACT	TAT	TAC	AAG	TTA	AAT	AAC	ACC	AAT	GGT	741	
Ser	Asn	Phe	Thr	Tyr	Tyr	Lys	Leu	Asn	Asn	Thr	Asn	Gly		235
						240								245
CTA	AAA	ACC	TAT	GAA	TTA	TGT	GAA	GAT	TAT	GAA	CAT	TGC	780	
Leu	Lys	Thr	Tyr	Glu	Leu	Cys	Glu	Asp	Tyr	Glu	His	Cys		250
									255					
ACT	GGC	TAT	GCT	ACC	AAT	GTA	TTT	GCT	CCG	ACA	TCA	GGT	819	
Thr	Gly	Tyr	Ala	Thr	Asn	Val	Phe	Ala	Pro	Thr	Ser	Gly		265
									270					
GGT	TAC	ATA	CCT	GAT	GGA	TTT	AGT	TTT	AAY	AAT	TGG	TRC	858	
Gly	Tyr	Ile	Pro	Asp	Gly	Phe	Ser	Phe	Asn	Asn	Trp	Phe		275
						280								285

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FIG. 9D

	TTG	CTT	ACA	AAT	AGT	TCC	ACT	TTT	GTT	AGT	GGC	AGG	TTT	897
Leu	Leu	Thr	Asn	Ser	Ser	Thr	Phe	Val	Ser	Gly	Arg	Arg	Phe	
	290								295					
GTA	ACA	AAT	CAA	CCA	TTA	TTG	ATT	AAT	TGC	TTG	TGG	CCA	936	
Val	Thr	Asn	Gln	Pro	Leu	Leu	Ile	Asn	Cys	Leu	Trp	Pro		
300					305					310				
GTG	CCC	AGT	TTT	GGT	GTA	GCA	CAA	GAA	TTT	TGT	TTT	957		
Val	Pro	Ser	Phe	Gly	Val	Ala	Ala	Glu	Phe	Cys	Phe			
315						320				325				
GAA	GGT	GCA	CAG	TTT	AGC	CAA	TGT	AAT	GGT	TCT	TCA	1014		
Glu	Gly	Ala	Gln	Phe	Ser	Gln	Cys	Asn	Gly	Val	Ser	Leu		
									335					
AAT	AAC	ACA	GTG	GAT	GTG	ATT	AGA	TTC	AAC	CTT	AAT	TTC	1053	
Asn	Asn	Thr	Val	Asp	Vai	Ile	Arg	Phe	Asn	Leu	Asn	Phe		
340						345				350				
ACT	GCA	GAT	GTA	CAA	TCT	GGT	ATG	GGT	GCT	ACA	GTA	TTT	1092	
Thr	Ala	Asp	Val	Gln	Ser	Gly	Met	Gly	Ala	Thr	Val	Phe		
									355		360			
TCA	CTG	AAT	ACA	ACA	GGT	GGT	GTC	ATT	CTT	GAA	ATT	TCA	1131	
Ser	Leu	Asn	Thr	Thr	Gly	Gly	Val	Ile	Leu	Glu	Ile	Ser		
365						370				375				
TGT	TAT	AGT	GAC	ACA	GTG	AGT	GAG	TCT	AGT	TCT	TAC	AGT	1170	
Cys	Tyr	Ser	Asp	Thr	Val	Ser	Glu	Ser	Ser	Ser	Tyr	Ser		
									385		390			

FIG. 9E

TAT GGT GAA ATC CCG TTC GGC ATA ACT GAC CGA CCA CGA 1209
Tyr Gly Glu Ile Pro Phe Gly Ile Thr Asp Gly Pro Arg 400

TAC TGT TAT GTA CTT TAC AAT GGC ACA GCT CTT AAA TAT 1248
Tyr Cys Tyr Val Leu Tyr Asn 410 Gly Thr Ala Leu Lys Tyr 415

TTA GGA ACA TTA CCA CCC AGT GTA AAG GAA ATT GCT ATT 1287
Leu Gly Thr Leu Pro Pro Ser Val Lys Glu Ile Ala Ile 425

AGT AAG TGG GGC CAT TTT TAT ATT AAT GGT TAC AAT TTC 1326
Ser Lys Trp Gly His Phe Tyr Ile Asn Gly Tyr Asn Phe 430 440

TTC AGC ACA TTT CCT ATT GRT ATA TCT TTT AAT TTA 1365
Phe Ser Thr Phe Pro Ile Xaa Cys Ile Ser Phe Asn Leu 445 455

ACC ACT GGT GTT AGT GGA GCT TTT TGG ACA ATT GCT TAC 1404
Thr Thr Gly Val Ser Gly Ala Phe Trp Thr Ile Ala Tyr 460 465

ACA TCG TAT ACT GAA GCA TTA GTA CAA GTT GAA AAC ACA 1443
Thr Ser Tyr Thr Glu Ala Leu Val Gln Val Glu Asn Thr 470 475 480

GCT ATT AAA AAT GTG ACG TAT TGT AAC AGT CAC ATT AAT 1482
Ala Ile LYS Asn Val Thr Tyr Cys Asn Ser His Ile Asn 485 490 495

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FIG. 9F

AAC	ATT	AAA	TGT	TCT	CAA	CTT	ACT	GCT	AAT	TTG	AAT	AAT	1521
Asn	Ile	Lys	Cys	Ser	Gln	Leu	Thr	Ala	Asn	Leu	Asn	Asn	505
495													
GGA	TTT	TAT	CCT	GTT	GCT	TCA	AGT	GAA	GTA	GGT	TTC	GTT	1560
Gly	Phe	Tyr	Pro	Val	Ala	Ser	Ser	Glu	Val	Gly	Phe	Val	520
AAT	AAG	AGT	GTT	GTG	TTA	TTA	CCT	AGC	TTT	TTC	ACA	TAC	1599
Asn	Lys	Ser	Val	Val	Leu	Leu	Pro	Ser	Phe	Phe	Thr	Tyr	530
ACC	GCT	GTC	AAT	ATA	ACC	ATT	GAT	CTT	GGT	ATG	AAG	CTT	1638
Thr	Ala	Val	Asn	Ile	Thr	Ile	Asp	Leu	Gly	Met	Lys	Leu	545
AGT	GGT	TAT	GGT	CAA	CCC	ATA	GCC	TCG	ACA	CTA	AGT	AAC	1677
Ser	Gly	Tyr	Gly	Gln	Pro	Ile	Ala	Ser	Thr	Leu	Ser	Asn	550
ATC	ACA	CTA	CCA	ATG	CAG	GAT	AAC	AAT	ACT	GAT	GTG	TAC	1716
Ile	Thr	Leu	Pro	Met	Gln	Asp	Asn	Asn	Thr	Asp	Val	Tyr	560
TGT	ATT	CGT	TCT	AAC	CAA	TTC	TCA	GTT	TAT	GTT	CAT	TCC	1755
Cys	Ile	Arg	Ser	Asn	Gln	Phe	Ser	Val	Tyr	Val	His	Ser	575
ACT	TGC	AAA	AGT	TCT	TTA	TGG	GAC	AAT	ATT	TTT	AAT	CAA	1794
Thr	Cys	Lys	Ser	Ser	Leu	Trp	Asp	Asn	Ile	Phe	Asn	Gln	590

+

FIG. 9G

GAC	TGC	ACG	GAT	GTT	TTA	GAG	GCT	ACA	GCT	GTT	ATA	AAA	1833
Asp	Cys	Thr	Asp	Val	Leu	Glu	Ala	Thr	Ala	Val	Ile	Lys	
600					605							610	
ACT	GGT	ACT	TGT	CCT	TTC	TCA	TTT	GAT	AAA	TTG	AAC	AAT	1872
Thr	Gly	Thr	Cys	Pro	Phe	Ser	Phe	Asp	Lys	Leu	Asn	Asn	
			615					620					
TAC	TTG	ACT	TTT	AAC	AAG	TTC	TGT	TTG	TCG	TTG	AGT	CCT	1911
Tyr	Leu	Thr	Phe	Asn	Lys	Phe	Cys	Leu	Ser	Leu	Ser	Pro	
					630					635			
GTT	GGT	GCT	AAT	TGC	AAG	TTT	GAT	GTT	GCT	GCA	CGT	ACA	1950
Val	Gly	Ala	Asn	Cys	Lys	Phe	Asp	Val	Ala	Ala	Arg	Thr	
					640			645				650	
AGA	ACC	AAT	GAG	CAG	GTT	GTA	AGT	CTA	TAT	GTA	ATA	1989	
Arg	Thr	Asn	Glu	Gln	Val	Val	Arg	Ser	Leu	Tyr	Val	Ile	
					655				660				
TAT	GAA	GAA	GGA	GAC	AAC	ATA	GTG	GGT	GTA	CCG	TCT	GAT	2028
Tyr	Glu	Glu	Gly	Asp	Asn	Ile	Val	Gly	Val	Pro	Ser	Asp	
					665			670				675	
RAT	AGC	GGT	CTG	CAC	GAT	TTG	TCT	GTG	CTA	CAC	CTA	GAC	2067
Xaa	Ser	Gly	Leu	His	Asp	Leu	Ser	Val	Leu	His	Leu	Asp	
					680				685				
TCC	TGT	ACA	GAT	TAC	AAT	ATA	TAT	GGT	AGA	ACT	GGT	GTT	2106
Ser	Cys	Thr	Asp	Tyr	Asn	Ile	Tyr	Gly	Arg	Thr	Gly	Val	
					695					700			

+

FIG. 9H

Gly	Ile	ATT	AGA	CGA	ACT	AAC	AGT	ACG	CTA	CTT	AGT	GGC	2145	
	Ile	TAT	TAC	TCA	C _{TA}	GGT	GAT	TTC	TTA	GGC	TTT			
		705	Arg	Arg	710	Ser	Asn	Thr	Leu	Leu	Ser	Gly	715	
Leu	Tyr	TTA	ACA	TCA	C _{TA}	GGT	GAT	TTC	TTA	GGC	TTT			
	Tyr	Tyr	Thr	Ser	Leu	Ser	Gly	Asp	Leu	Leu	Gly	Phe	720	
Lys	Asn	AAA	AAT	GT _T	AGT	GAT	GTC	ATT	TAT	TCT	GTG	ACG	CCA	2223
	Vai	730	Vai	Ser	Asp	Gly	Val	Ile	Tyr	Ser	Val	Thr	Pro	
Cys	Asp	TGT	GAT	GTA	AGC	GCA	CAA	GCG	GC				2246	
	Vai	745	Ser	Ala	Gln	Ala								